

CLAIMS

What is claimed is:

- 1 1. A method for automated management of hydrocarbon gathering, the  
2 method comprising:  
3 collecting data from a plurality of automated measurement and control  
4 devices positioned in a hydrocarbon gathering system;  
5 comparing the collected data with data stored in a database; and  
6 using the data comparison to automatically schedule a test of at least one of  
7 the plurality of automated measurement and control devices.
- 1 2. The method of claim 1, wherein the data stored in the database is  
2 automatically updated with the collected data.
- 1 3. The method of claim 1, wherein the stored data comprises contractual  
2 provisions contained in contracts between a hydrocarbon gathering company and  
3 another entity.
- 1 4. The method of claim 3, wherein the contractual provisions comprise a  
2 testing frequency for the automated measurement and control devices.
- 1 5. The method of claim 1, wherein the management data comprises test  
2 scheduling data defined by a hydrocarbon gathering company.
- 1 6. The method of claim 1, wherein the plurality of measurement and control  
2 devices comprises electronic flow meters.

1 7. The method of claim 1, wherein the plurality of automated measurement  
2 and control devices comprises programmable logic controllers.

1 8. The method of claim 1, wherein the plurality of automated measurement  
2 and control devices comprises remote terminal units.

1 9. The method of claim 1, wherein the plurality of automated measurement  
2 and control devices comprises automated gas composition analysis devices.

1 10. The method of claim 1, wherein using the data comparison further  
2 comprises:

3 notifying a field technician of a required test for at least one of the plurality  
4 of automated measurement and control devices; and  
5 automatically notifying a witness of the test after the field technician has  
6 selected a test date.

1 11. The method of claim 1, wherein using the data comparison further  
2 comprises:

3 analyzing the collected data to determine a volume of a flow of  
4 hydrocarbons through at least one of the plurality of automated measurement and  
5 control devices;

6 comparing the volume of the hydrocarbon flow to contractual provisions  
7 stored in the database; and

8 automatically scheduling meter tests according to the stored contractual  
9 provisions.

- 1 12. The method of claim 1, further comprising:  
2 automatically updating the database after testing of at least one of the  
3 plurality of automated measurement and control devices.
- 1 13. The method of claim 11, wherein selected field personnel are automatically  
2 notified of the automatically scheduled tests.
- 1 14. The method of claim 13, wherein the automatic notification is transmitted  
2 electronically.
- 1 15. The method of claim 11, wherein a witness is automatically notified of the  
2 automatically scheduled tests.
- 1 16. The method of claim 15, wherein the automatic notification is transmitted  
2 electronically.
- 1 17. The method of claim 1, further comprising:  
2 testing at least one of the plurality of automated measurement and control  
3 devices;  
4 automatically comparing test data with master testing data stored in the  
5 database; and  
6 generating an alarm if a variance between the new testing data and the  
7 master testing data exceeds a selected threshold.

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1 18. The method of claim 1, further comprising:  
2 automatically measuring electrical current flow in at least one cathodic  
3 protection system positioned in the hydrocarbon gathering system; and  
4 generating an alarm if the automatically measured electrical current flow  
5 exceeds a selected threshold.

1 19. The method of claim 1, wherein a computer system connected to the  
2 database automatically generates an alarm when a selected event is detected.

1 20. The method of claim 19, wherein the selected event comprises detection of  
2 non-conforming test data collected from at least one of the plurality of automated  
3 measurement and control devices.

1 21. The method of claim 19, wherein the selected event comprises detection of  
2 a failure of at least one of the plurality of automated measurement and control  
3 devices.

1 22. The method of claim 19, wherein the selected event comprises detection of  
2 a system imbalance beyond a selected threshold.

1 23. The method of claim 19, wherein the selected event comprises detection of  
2 a change in natural gas composition beyond a selected threshold.

1 24. A method for automated management of hydrocarbon gathering, the  
2 method comprising:  
3 collecting well test data from at least one of a plurality of producing wells  
4 in a hydrocarbon gathering system;  
5 using the well test data to automatically reallocate hydrocarbon production  
6 to at least one of the plurality of producing wells.

1 25. The method of claim 24, wherein the well test data is used to automatically  
2 reallocate production costs to at least one of the plurality of producing wells.

1 26. The method of claim 24, wherein the well test data is used to automatically  
2 populate regulatory forms.

1 27. The method of claim 24, wherein the well test data is automatically  
2 reported to selected users.

1 28. A method for automated management of hydrocarbon gathering, the  
2 method comprising:  
3 calculating a system balance for a selected balance envelope;  
4 collecting hydrocarbon sample test data from at least one of a plurality of  
5 automated measurement and control devices positioned in a hydrocarbon  
6 gathering system; and  
7 using the hydrocarbon sample test data to automatically recalculate the  
8 system balance.

- 1 29. The method of claim 28, further comprising:  
2 using the recalculated system balance to mix hydrocarbon products from at  
3 least two gathering pipelines to produce a desired hydrocarbon flow composition.
- 1 30. The method of claim 29, wherein the desired hydrocarbon flow  
2 composition is selected to minimize hydrocarbon processing costs.
- 1 31. The method of claim 28, wherein the plurality of measurement and control  
2 devices comprises electronic flow meters.
- 1 32. The method of claim 28, wherein the plurality of automated measurement  
2 and control devices comprises programmable logic controllers.
- 1 33. The method of claim 28, wherein the plurality of automated measurement  
2 and control devices comprises remote terminal units.
- 1 34. The method of claim 28, wherein the plurality of automated measurement  
2 and control devices comprises automated gas composition analysis devices.
- 1 35. The method of claim 28, wherein a database is automatically updated after  
2 recalculation of the system balance.
- 1 36. The method of claim 28, wherein the system balance comprises a volume  
2 balance.
- 1 37. The method of claim 28, wherein the system balance comprises an energy  
2 balance.

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1 38. The method of claim 28, wherein the system balance comprises a natural  
2 gas component balance.

1 39. The method of claim 28, wherein the balance envelope comprises a  
2 combination of user defined selected ones of the plurality of automated  
3 measurement and control devices.

1 40. A method for automated management of hydrocarbon gathering, the  
2 method comprising:  
3 calculating a system balance for a selected balance envelope;  
4 testing at least one of a plurality of automated measurement and control  
5 devices positioned in a hydrocarbon gathering system; and  
6 using the test data to automatically recalculate the system balance.

1 41. The method of claim 40, wherein the plurality of measurement and control  
2 devices comprises electronic flow meters.

1 42. The method of claim 40, wherein the plurality of automated measurement  
2 and control devices comprises programmable logic controllers.

1 43. The method of claim 40, wherein the plurality of automated measurement  
2 and control devices comprises remote terminal units.

1 44. The method of claim 40, wherein the plurality of automated measurement  
2 and control devices comprises automated gas composition analysis devices.

1 45. A method for automated management of hydrocarbon gathering, the  
2 method comprising:  
3 calculating a composition of hydrocarbon flow in a hydrocarbon gathering  
4 system;  
5 collecting hydrocarbon sample test data from a plurality of automated  
6 measurement and control devices positioned in the hydrocarbon gathering system;  
7 and  
8 using the hydrocarbon sample test data to automatically recalculate the  
9 composition of hydrocarbon flow in the hydrocarbon gathering system.

1 46. The method of claim 45, wherein the plurality of measurement and control  
2 devices comprises electronic flow meters.

1 47. The method of claim 45, wherein the plurality of automated measurement  
2 and control devices comprises programmable logic controllers.

1 48. The method of claim 45, wherein the plurality of automated measurement  
2 and control devices comprises remote terminal units.

1 49. The method of claim 45, wherein the plurality of automated measurement  
2 and control devices comprises automated gas composition analysis devices.

1 50. The method of claim 45, further comprising:  
2 automatically updating a database after recalculation of the hydrocarbon  
3 flow composition.

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1 51. The method of claim 1, wherein the collected data and data stored in the  
2 database are used to model pipeline hydraulics.

1 52. The method of claim 1, further comprising:  
2 using the collected data and data stored in the database to automatically  
3 generate a report for a selected unit of a hydrocarbon gathering system.

1 53. The method of claim 1, wherein the collected data and data stored in the  
2 database are used to evaluate reservoir production.

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